PQ1CY1032Z

TO-263 Surface Mount Type Chopper Regulator

Features

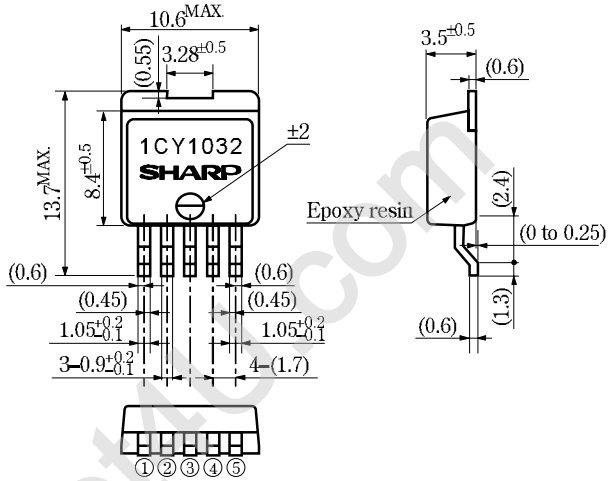
- Maximum switching current: 3.5A
- Built-in ON/OFF control function
- Built-in soft start function to suppress overshoot of output voltage in power on sequence or ON/OFF control sequence
- Built-in oscillation circuit
  (Oscillation frequency: TYP. 150kHz)
- Built-in overheat protection function, overcurrent shut-down function
- TO-263 package
- PQ1CY1032ZZ: Sleeve-packaged product
  PQ1CY1032ZP: Tape-packaged product
- Variable output voltage
  (Output variable range: Vref to 35V/−Vref to −30V)
  [Possible to select step-down output/inversing output according to external connection circuit]

Applications

- LCD monitors
- Car navigation systems
- Switching power supplies

Outline Dimensions

(Unit : mm)



① V_{IN}
② V_{OUT}
③ COM (Common to heat sink)
④ Oadj
⑤ Vsoft

( ) : Typical dimensions

Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1Input voltage	V_{IN}	40	V
Error input voltage	V_{ADJ}	7	V
Input-output voltage	V_{I-O}	41	V
*2Output − COM voltage	V_{OUT}	−1	V
*3V_{soft} terminal voltage	V_{soft}	−0.3 to +40	V
Switching current	I_{SW}	3.5	A
*4Power dissipation	P_D	35	W
*5Junction temperature	T_j	150	°C
Operating temperature	T_{opr}	−20 to +85	°C
Storage temperature	T_{stg}	−40 to +150	°C
Soldering temperature	T_{sol}	260 (10s)	°C

*1 Voltage between V_{IN} terminal and COM terminal
*2 Voltage between V_{OUT} terminal and COM terminal
*3 Voltage between V_{SOFT} terminal and COM terminal
*4 P_D: With infinite heat sink
*5 Overheat protection may operate at T_j=125°C to 150°C

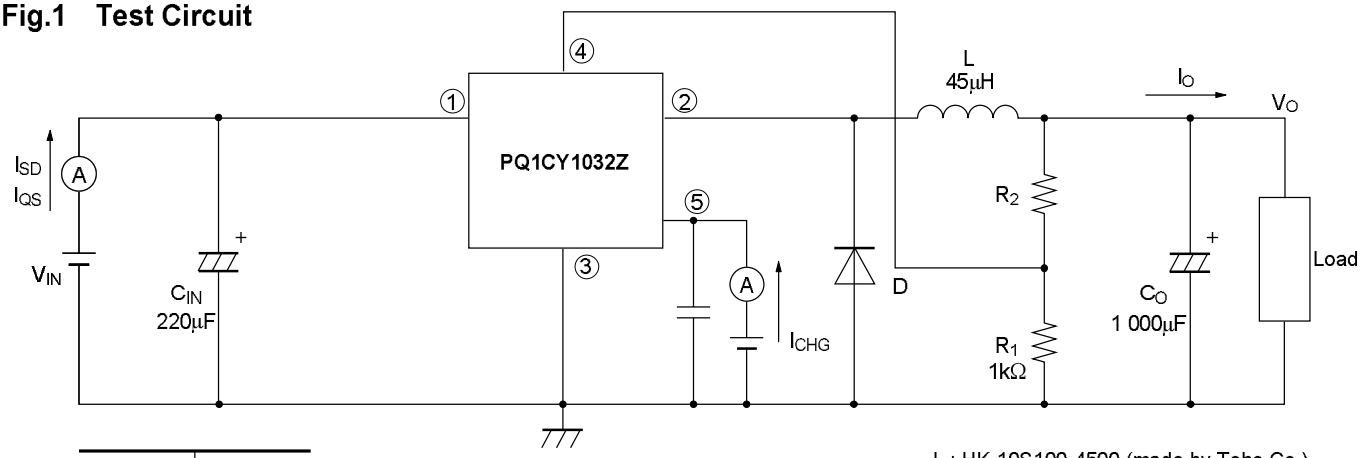
• Please refer to the chapter " Handling Precautions ".

Electrical Characteristics

(Unless otherwise specified, condition shall be V_{IN}=12V, I_O=0.5A, V_O=5V, V_{soft} terminal=0.1µF, Ta=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output saturation voltage	V_{SAT}	I_{SW}=3A	–	1.4	1.8	V
Reference voltage	V_{ref}	–	1.235	1.26	1.285	V
Reference voltage temperature fluctuation	ΔV_{ref}	T_j=0 to 125°C	–	±0.5	–	%
Load regulation	$\|R_{egL}\|$	I_O=0.5 to 3A	–	0.2	1.5	%
Line regulation	$\|R_{egI}\|$	V_{IN}=8 to 35V	–	1	2.5	%
Efficiency	η	I_O=3A	–	80	–	%
Oscillation frequency	f_O	–	135	150	165	kHz
Oscillation frequency temperature fluctuation	Δf_O	T_j=0 to 125°C	–	±2	–	%
Overcurrent detecting level	I_L	–	3.6	4.2	5.8	A
Charge current	I_{CHG}	②, ④ terminals is open, ⑤ terminal	–	–10	–	µA
Input threshold voltage	V_{THL}	Duty ratio=0%, ④ terminal=0V, ⑤ terminal	–	1.3	–	V
	V_{THH}	Duty ratio=100%, ④ terminals is open, ⑤ terminal	–	2.3	–	V
ON threshold voltage	$V_{TH(ON)}$	④ terminal=0V, ⑤ terminal	0.7	0.8	0.9	V
Overcurrent shutdown threshold voltage	V_{THIL}	⑤ terminal	3.8	4.6	5.5	V
Stand-by current	I_{SD}	V_{IN}=40V, ⑤ terminal=0V	–	140	400	µA
Output OFF-state dissipation current	I_{QS}	V_{IN}=40V, ⑤ terminal=0.9V	–	8	16	mA

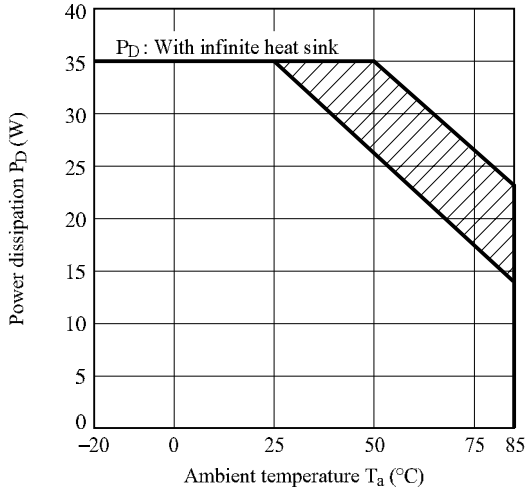
Fig.1 Test Circuit



5 terminal	V_O output
LOW	OFF
HIGH	ON
OPEN	ON

L : HK-10S100-4500 (made by Toho Co.)
D :ERC80-004 (made by Fuji electronics Co.)

Fig.2 Power Dissipation vs. Ambient Temperature



Note) Oblique line portion:Overheat protection may operate in this area.

Fig.3 Overcurrent Protection Characteristics (Typical Value)

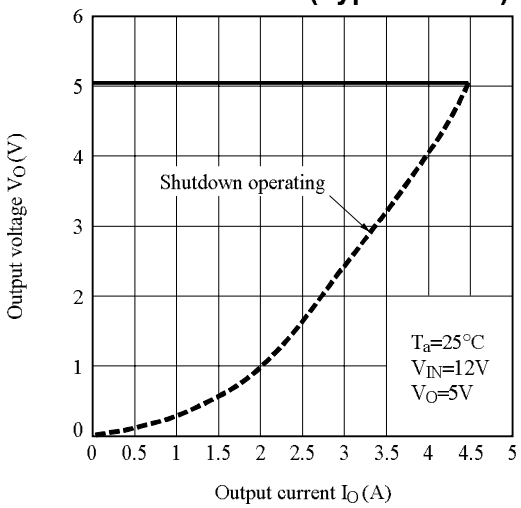


Fig.4 Efficiency vs. Input Voltage

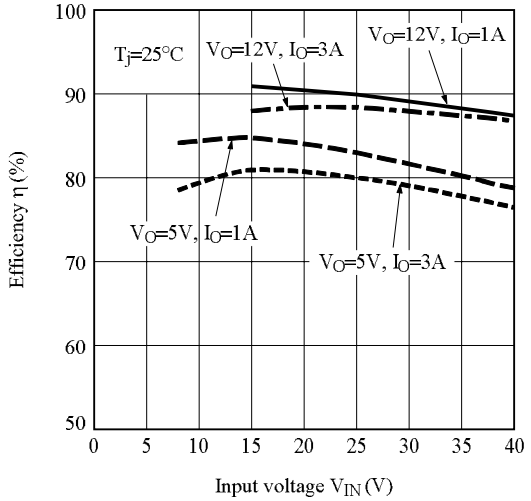


Fig.5 Switching Current vs. Output Saturation Voltage

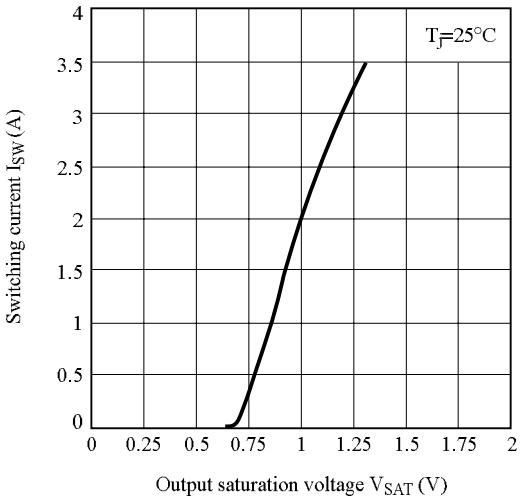


Fig.6 Operating Dissipation Current vs. Input Voltage

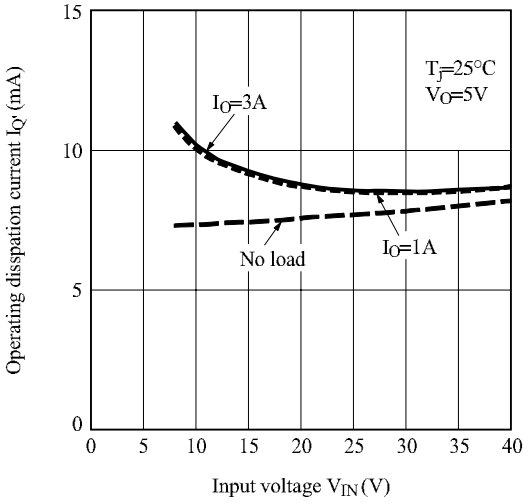


Fig.7 Reference Voltage Fluctuation vs. Junction Temperature

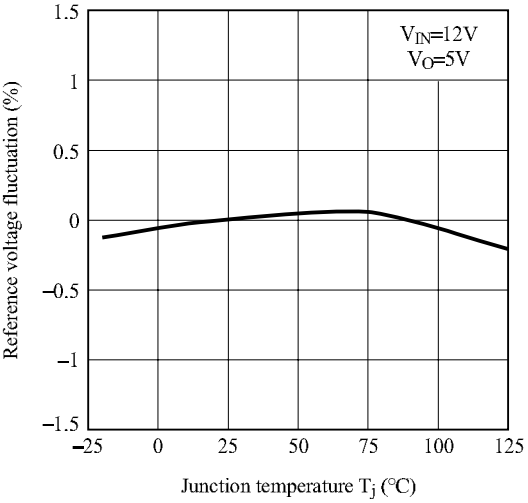


Fig.8 Load Regulation vs. Output Current

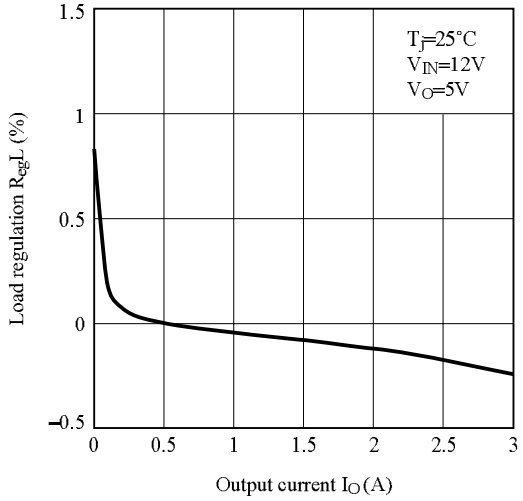


Fig.9 Line Regulation vs. Input Voltage

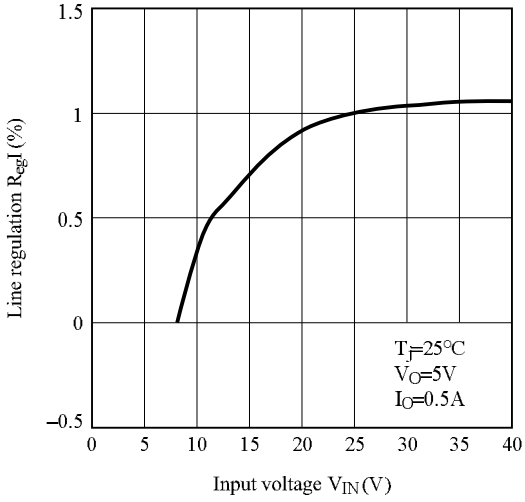


Fig.10 Oscillation Frequency Fluctuation vs. Junction Temperature

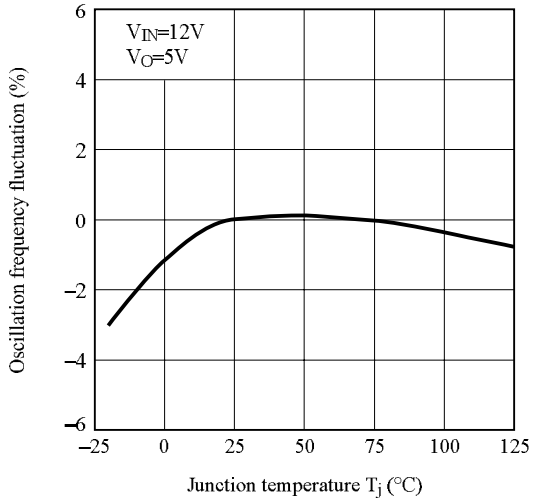


Fig.11 Overcurrent Detecting Level Fluctuation vs. Junction Temperature

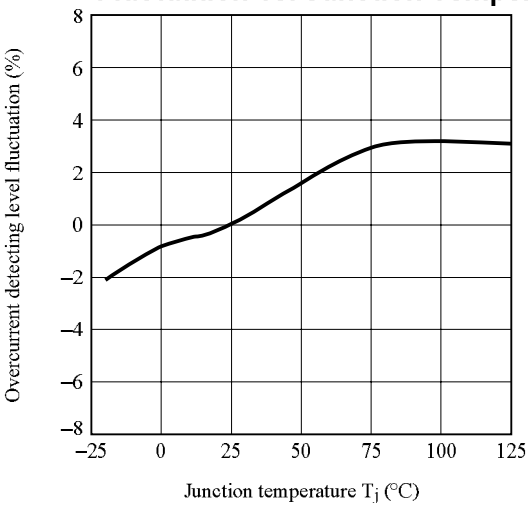


Fig.12 On Threshold Voltage vs. Junction Temperature

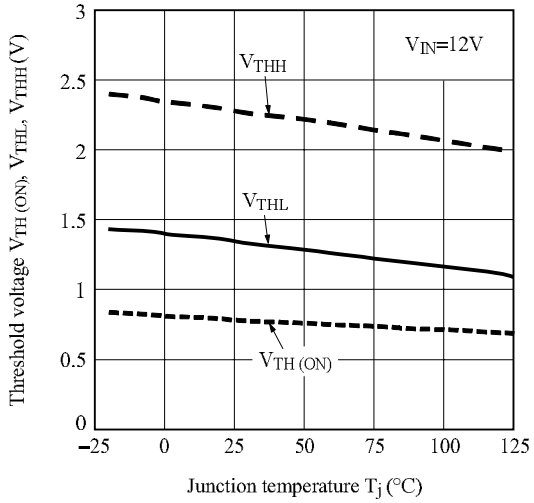


Fig.13 Overcurrent Shutdown Threshold Voltage vs. Junction Temperature

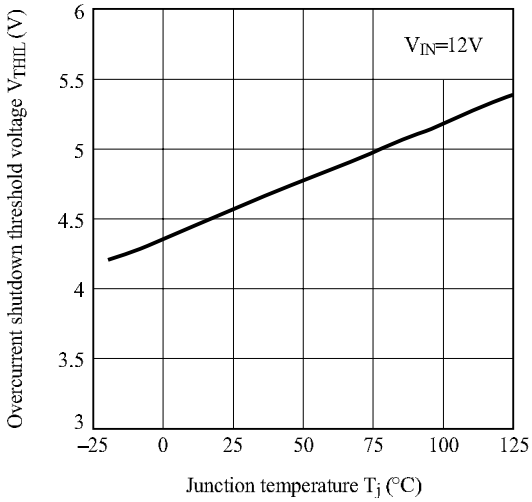
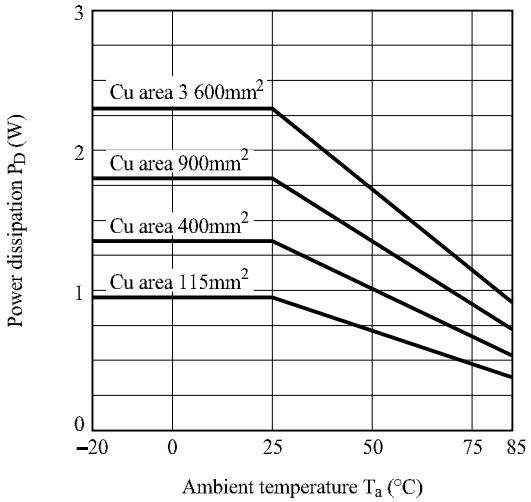


Fig.14 Power Dissipation vs. Ambient Temperature (Typical Value)



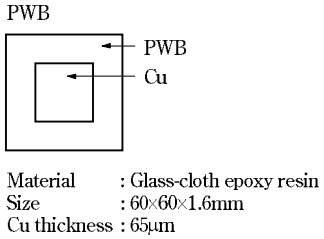


Fig.15 Block Diagram

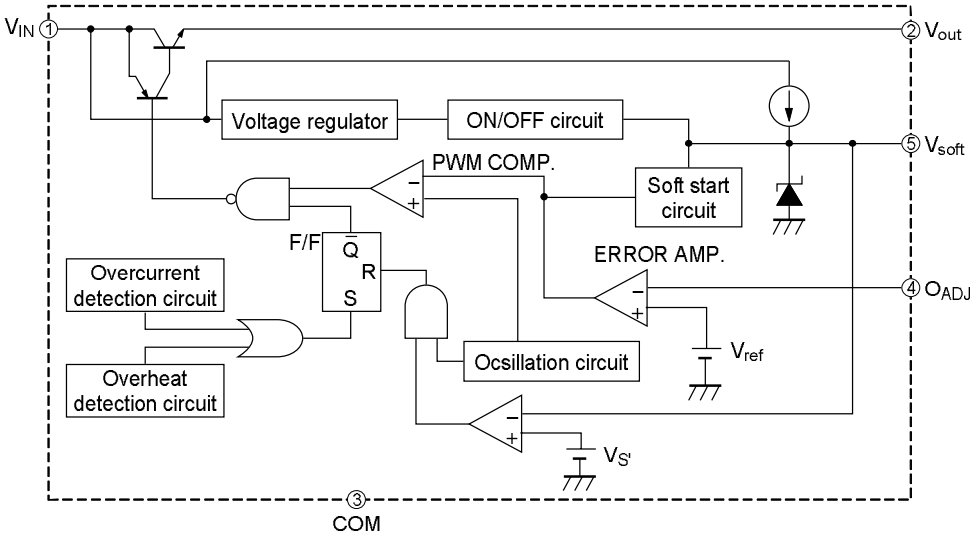


Fig.16 Step Down Type Circuit Diagram

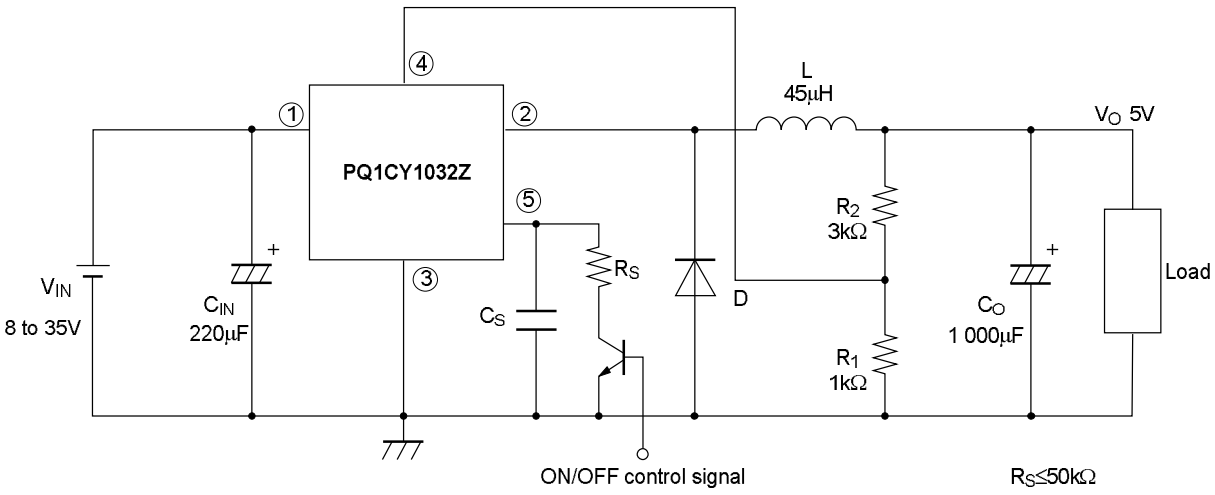
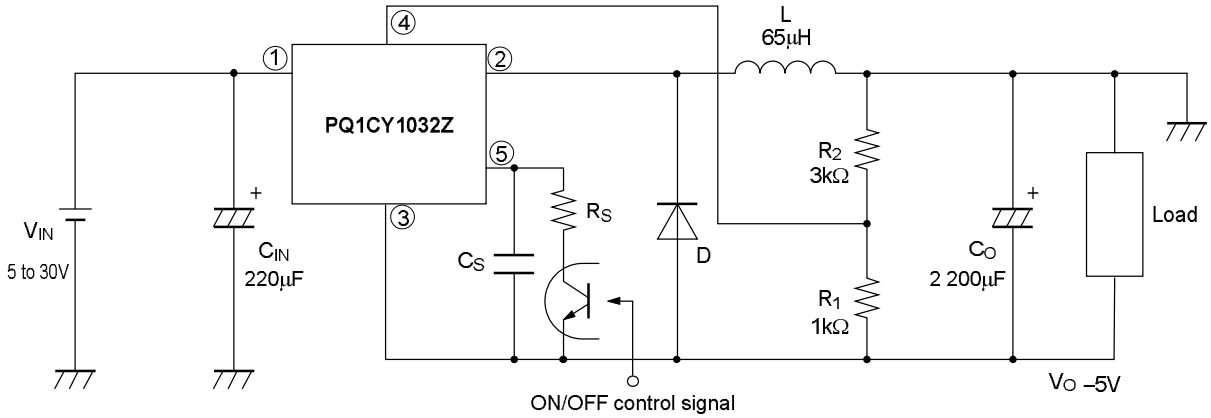


Fig.17 Polarity Inversion Type Circuit Diagram



NOTICE

- The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

  (i) The devices in this publication are designed for use in general electronic equipment designs such as:
  --- Personal computers
  --- Office automation equipment
  --- Telecommunication equipment [terminal]
  --- Test and measurement equipment
  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

  (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
  --- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
  --- Traffic signals
  --- Gas leakage sensor breakers
  --- Alarm equipment
  --- Various safety devices, etc.

  (iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
  --- Space applications
  --- Telecommunication equipment [trunk lines]
  --- Nuclear power control equipment
  --- Medical and other life support equipment (e.g., scuba).

- Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control Law of Japan, it is necessary to obtain approval to export such SHARP devices.
-
- Contact and consult with a SHARP representative if there are any questions about the contents of this publication.